WHAT IS CLAIMED IS:

1. A signal switching device including a plurality of transmission paths connected to an input path, said signal switching device outputting a signal from the input path through one of the transmission paths, comprising:

a first variable impedance unit connected to a first transmission path, said first variable impedance unit including a first section formed from a superconducting material, said first section being set to a non-superconducting state when the signal is to be output through a second transmission path, said first section including a portion of a predetermined length at an input end thereof, said portion having an area of a cross section less than an area of a cross section of the first section at an output end thereof.

2. The signal switching device as claimed in claim 1, wherein when the signal is to be output through the first transmission path, the second transmission path is adjusted to have an input impedance greater than a predetermined value.

3. The signal switching device as claimed in claim 1, wherein a width of said portion is less than a width of the first section at the output end.

4. The signal switching device as claimed in claim 1, wherein a thickness of said portion is less than a thickness of said first section at the output end.

5. The signal switching device as claimed in claim 1, further comprising a selection unit configured to select the first transmission path as the transmission path through which the signal is to be output by changing a conduction state of the superconducting material of the first section.

6. A signal switching device including a plurality of transmission paths connected to an input path, said signal switching device outputting a signal from the input path through one of the transmission paths, comprising:

a first variable impedance unit connected to a first transmission path in series, said first

variable impedance unit including a first section formed from a superconducting material; and

a second variable impedance unit provided on a second transmission path in parallel to a signal line of the second transmission path, said second variable impedance unit including a second section formed from a superconducting material, an area of a cross section of said second section being less than an area of a cross section of the signal line of the second transmission path, a length of the signal line of the second transmission path being determined in such a way that an input impedance of the second transmission path is greater than a predetermined value when the second section is in a superconducting state.

7. The signal switching device as claimed in claim 6, wherein when the second section is in a superconducting state, a length of the second section is adjusted so that an input impedance from the second transmission path to the second section is less than a predetermined value.

8. The signal switching device as claimed in claim 7, wherein an end of the second section is connected to the second transmission path, and another end of the second section is grounded.

9. The signal switching device as claimed in claim 8, wherein the length of the second section equals half of a wavelength of the signal, or a multiple of half of the wavelength of the signal.

10. The signal switching device as claimed in claim 7, wherein an end of the second section is connected to the second transmission path, and another end of the second section is open; and

the length of the second section equals a quarter of a wavelength of the signal or an odd multiple of a quarter of the wavelength of the signal.

11. The signal switching device as claimed in claim 6, further comprising a selection unit configured to select one of the first transmission path and the second transmission path as the transmission path through which the signal is to be output by changing conduction states of the superconducting material of the first section and the superconducting material of the second section.

12. The signal switching device as claimed in claim 6, further comprising:

a third variable impedance unit connected to a third transmission path in series, said third variable impedance unit including a third section formed from a superconducting material; and

a fourth variable impedance unit provided on the third transmission path in parallel to a signal line of the third transmission path, said fourth variable impedance unit including a fourth section formed from a superconducting material, an area of a cross section of said fourth section being less than an area of a cross section of the signal line of the third transmission path, a length of the signal line of the third transmission path being determined in such a way that an input impedance of the third transmission path is greater than a predetermined value when the fourth section is in a superconducting state.

13. The signal switching device as claimed in claim 12, wherein when the fourth section is in a superconducting state, a length of the fourth section is adjusted so that an input impedance from the third transmission path to the fourth section is less than a predetermined value.

14. The signal switching device as claimed in claim 13, wherein an end of the fourth section is connected to the third transmission path, and another end of the fourth section is grounded.

15. The signal switching device as claimed in claim 14, wherein the length of the fourth section equals half of a wavelength of the signal, or a multiple of half of the wavelength of the signal.

16. The signal switching device as claimed in claim 13, wherein an end of the fourth section is connected to the third transmission path, and another end of the fourth section is open; and

the length of the fourth section equals a quarter of a wavelength of the signal or an odd multiple of a quarter of the wavelength of the signal.

17. The signal switching device as

claimed in claim 12, further comprising a selection unit configured to select one of the first transmission path, the second transmission path and the third transmission path as the transmission path through which the signal is to be output by changing conduction states of the superconducting material of the first section, the superconducting material of the second section, the superconducting material of the third section, and the superconducting material of the fourth section.